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1999

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Record of Decision:

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INDIANAPOLIS, IN
07/26/1999

Decision Document

for

Transferable Portion of AOC 5 - North - South Sanitary Sewer

Naval Air Warfare Center

Indianapolis, Indiana

Southern Division

Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0012

July 1999

DECISION DOCUMENT
FOR
TRANSFERABLE PORTION OF
AOC 5 - NORTH - SOUTH SANITARY SEWER

NAVAL AIR WARFARE CENTER
INDIANAPOLIS, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

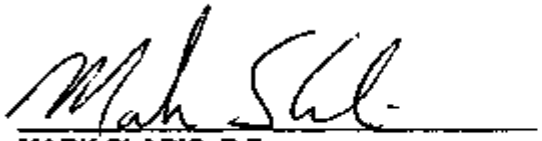
Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0012

JULY 1999

PREPARED UNDER THE SUPERVISION OF:



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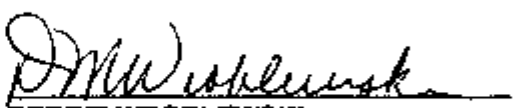

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

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FIGURES

NUMBER **PAGE NO.**

ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
BCT	BRAC Clean-up Team
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CFR	Code of Federal Regulations
COPC	Chemicals of Potential Concern
DCE	Dichloroethene
IDEM	Indiana Department of Environmental Management
IR	Installation Restoration
mg/kg	milligram per kilogram
NAVFAC	Naval Facilities Engineering
NAWC	Naval Air Warfare Center Command
NCP	National Contigency Plan
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PRG	Preliminary Remediation Goal
RAB	Restoration Advisory Board
RBC	Risk Based Concentration
RI	Remedial Investigation
RCRA	Resource Conservation and Recovery Act
SOUTHDIV	Southern Division, Naval Facility Engineering Command
SSL	Soil Screening Level
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 DECLARATION OF THE DECISION DOCUMENT

1.1 SITE NAME AND LOCATION

AREA OF CONCERN FIVE (AOC5)
TRANSFERABLE PORTION OF NORTH-SOUTH SANITARY SEWER
NAVAL AIR WARFARE CENTER (NAWC) INDIANAPOLIS
INDIANAPOLIS, INDIANA

1.2 STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the transferable portion of the North-South Sanitary Sewer (AOC5) NAWC Indianapolis, Indianapolis, Indiana, developed in accordance with CERCLA, as amended by SARA, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this Site, at the Warren Library, Indianapolis, Indiana.

The State of Indiana and the U.S. EPA concur on the selected remedy.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Decision Document, may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

AOC 5 encompasses contamination in the transferable portion of the North-South Sanitary Sewer. Based on current Site conditions it has been determined that future risk to human health and the environment would be within acceptable limits assuming continued industrial use of the property. Therefore, no further remedial action beyond those institutional (i.e. land use) controls specified in this document is planned.

The major components of those institutional controls selected for implementation include:

- Restricting future land use to non-residential purpose to specifically include, but not limited to, the prohibition of playgrounds, day care facilities and facilities for the elderly.

- Retention of a right of access by the Navy, and Federal and State regulators for purposes of undertaking future environmental investigations, inspections and/or remedial actions.

1.5 STATUTORY DETERMINATION

Because this remedy will result in contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

1.6 DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes alternative solutions and treatment technologies to the maximum extent practical for this site. However, because active treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 5 precludes a remedy in which contaminants could be treated effectively.

Carl Loop — 9/2/99

Carl Loop, US Navy, Southern Division (SOUTHNAVFACENGCOM)
BCT Member — Date

Concurrence:

Denise Boone — 9/8/99

Denise Boone, USEPA, Region V
BCT Member — Date

Sean Grady — 9/2/99

Sean Grady, Indiana Department of Environmental Management
BCT Member — Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

NAWC Indianapolis is located in Marion County, east of downtown Indianapolis within a predominantly residential/commercial area (See Figure 2-1). NAWC Indianapolis is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south, and a small waterway, Windsor Branch, to the east. Most of the commercial establishments within the immediate vicinity of NAWC Indianapolis are located along East 21st Street or Arlington Avenue. Businesses in the area include gas stations, car washes, dry cleaners, and office buildings. The areas immediately beyond the businesses lining East 21st and Arlington Avenue are predominantly residential, as are the areas south and east of the NAWC.

In late 1995, the Department of Defense decided to place the NAWC Indianapolis on the base realignment and closure list. This initiated the conversion of the facility from a government-owned and operated facility to the private sector. The NAWC Indianapolis is currently under the direction of Raytheon, under lease from the City of Indianapolis, who, in turn, leases the property from the U.S. Government. Figure 2-2 shows a layout of NAWC Indianapolis and the location of AOC 5.

The ground surface at NAWC Indianapolis is generally flat, sloping slightly from the northern boundary toward the southeast. Surface water drainage at the facility mostly occurs as overland flow during heavy precipitation events. This overland flow is collected and routed through a storm sewer system to two discharges locations: (1) a nearby stream to the southeast of the facility via permitted spillways and an off-site storm sewer system; and (2) a water retention pond in the southwest portion of the site. The retention pond was constructed to facilitate surface water infiltration and to alleviate ponded water on the facility grounds.

The unconsolidated glacial overburden is approximately 150 feet thick at the facility and is comprised of three aquifers or aquifer zones, namely the shallow aquifer zone, middle aquifer and deep aquifer. Each of these varies in thickness, composition, and horizontal extent throughout the site area. The shallow aquifer may be unconfined or semi-confined in some areas where it is near to the ground surface or where it is not overlain by till or other low permeability materials. The shallow aquifer ranges in thickness from 0.5 to 25 feet; the middle aquifer ranges in thickness from 1 to 34 feet; and the deep aquifer ranges in thickness from 5 to 26 feet. The shallow and middle aquifers are only believed to be horizontally continuous on the eastern and southern portions of NAWC Indianapolis, whereas the deep aquifer is

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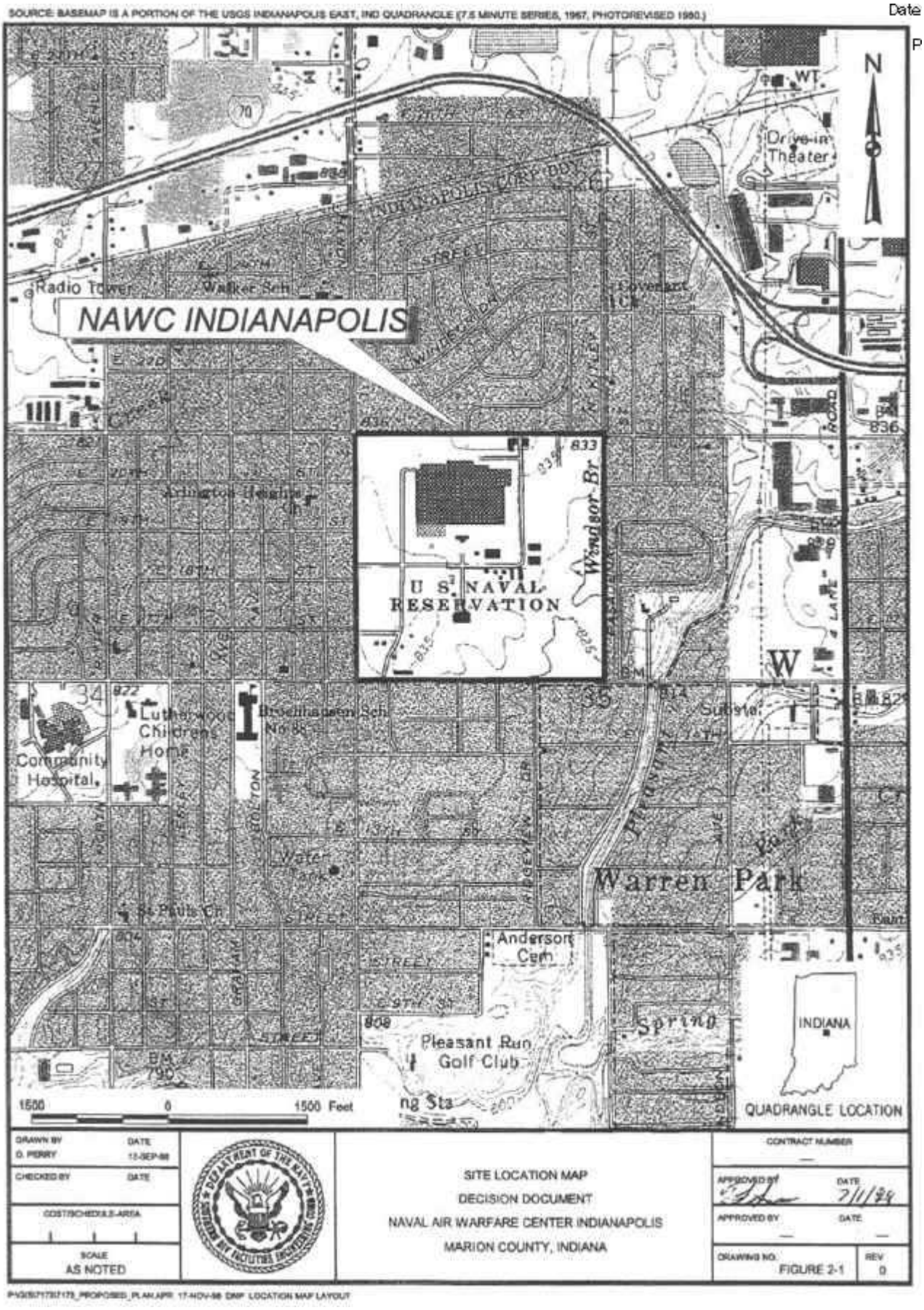
SOURCE: BASEMAP IS A PORTION OF THE USGS INDIANAPOLIS EAST, IND QUADRANGLE (7.5 MINUTE SERIES, 1967, PHOTOREVISED 1980.)
NAWC INDIANAPOLIS
U S NAVAL RESERVATION
Warren Park
Pleasant Run Golf Club
Anderson Cem
Community Hospital
Lutherwood Childrens Home
Brookhaven Sch No 88
Arlington Heights Ch
Walker Sch
Radio Tower
Drive-in Theater
Windsor Br
Water Tank
INDIANA
QUADRANGLE LOCATION
1500 0 1500 Feet
N
DRAWN BY O. PERRY
DATE 13-SEP-99
CHECKED BY
DATE
COST/SCHEDULE-AREA
SCALE AS NOTED
SITE LOCATION MAP
DECISION DOCUMENT
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA
CONTRACT NUMBER
APPROVED BY
DATE 7/11/99
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DATE
DRAWING NO. FIGURE 2-1
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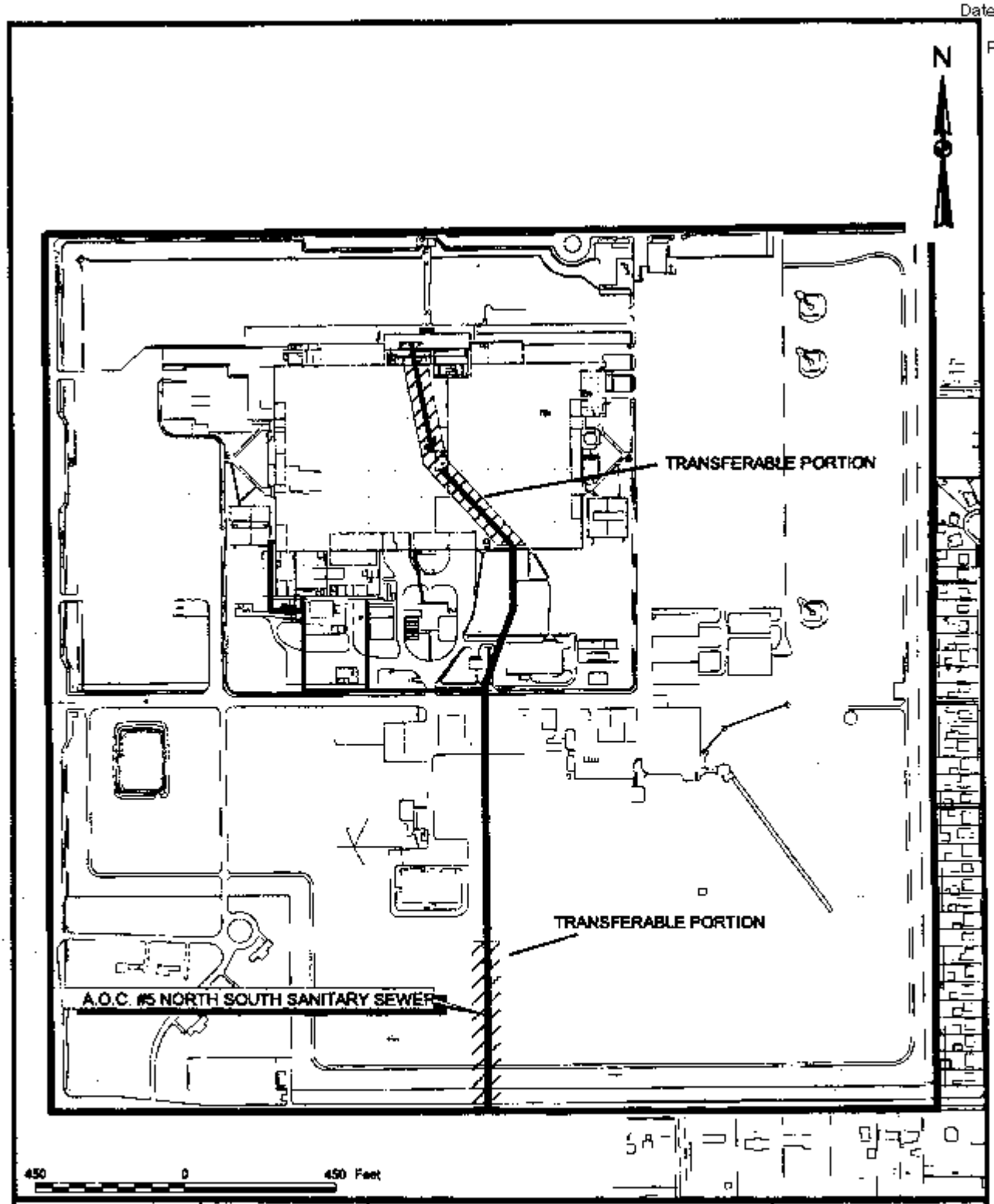
N
TRANSFERABLE PORTION
TRANSFERABLE PORTION
A.O.C. #5 NORTH SOUTH SANITARY SEWER
450 0 450 Feet
FACILITY PLAN
AOC 5 DECISION DOCUMENT
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA
SCALE
AS NOTED
FIGURE 2-2

expected to be horizontally continuous throughout the entire NAWC. Each of these aquifer zones are separated by low permeable glacial till aquitards. The aquitard between the shallow and middle aquifers ranges in thickness between 15 to 19 feet and the aquitard between the middle and deep aquifer ranges between 23 and 41 feet thick.

The groundwater flow direction across the facility in the shallow and middle aquifer zones is generally to the southeast and south, while flow in the deep aquifer is southwest. It is likely that groundwater in the shallow aquifer discharges into Windsor Branch and Pleasant Run to the east and southeast of the facility. The average horizontal hydraulic gradient for the shallow aquifer was 0.0071 ft/ft on December 10, 1996 and 0.0116 ft/ft on September 27, 1997. The average horizontal hydraulic gradient is 0.014 ft/ft in the middle aquifer, and 0.005 ft/ft in the deep aquifer. The average vertical gradient between monitoring wells screened in the shallow and middle aquifer is 0.5 ft/ft downward in the north-central and southern edges of the NAWC. Between the shallow and middle aquifers, the average vertical gradient in the northeastern corner of the NAWC is 0.13 ft/ft upward. This upward gradient indicates potential recharge of Windsor Branch immediately east of the NAWC from the shallow aquifer. The average hydraulic gradient between the middle and the deep aquifer is 1.3 ft/ft. For additional information on the geology and hydrogeology at the NAWC Indianapolis please refer to B&R Environmental (1997) and USGS (1997, 1998).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Areas immediately under the current and former plating areas have been previously identified as areas of concern. The original plating area operated between 1942 until 1965. The new plating area in Building 1200 began operation in approximately 1965. Sanitary sewers serving both locations are suspected to be vitrified clay pipe. Based on a video survey, the sewer is believed to contain some cracks and separated joints.

Spent plating solutions and dilute plating rinses were historically discharged to the sanitary sewer from the current and former plating areas. Heavy metal plating solutions were used, cyanide-based plating solution use was common, and a solvent degreasing operation was present.

No previous analytical data for the environmental condition of the area was available.

Parts of the sewer run beneath other AOCs or areas potentially affected by other AOCs. These areas, described in other documents, are not yet available for transfer to the City of Indianapolis. The parts of

the sewer that are not potentially affected by other AOCs can be transferred. There are two segments that are transferable: the first segment begins at Building 2000, travels under Building 1000 and stops at the south wall of Building 1000. The second segment begins about 500 feet north of East 16th Street and ends at the southern property line. The transferable segments are shown on Figure 2-2.

The NAWC Indianapolis, under the office of the Chief of Naval Operations (CNO) initiated an Environmental Compliance Evaluation (ECE) program to identify environmental compliance deficiencies, provide recommendations for corrective action, and establish a basis for future budgets. The first ECE was performed in October 1991. The next ECE was performed in 1994, at which time a total of 21 environmental media/program areas were evaluated. The ECE's are maintained on site. Environmental programs and procedures were typically updated to meet ECE deficiencies.

In anticipation of the transfer from the government to the private sector, an Environmental Baseline Survey (EBS) was prepared by Brown & Root (B&R) Environmental (March 1996) to document the results of a modified Phase I environmental site assessment. The site assessment was performed in accordance with the U.S. Department of Defense (U.S. DOD) requirement for property intended to be sold, leased, transferred or acquired. The EBS reported findings on the status of the NAWC Indianapolis property and off-base property based on visual inspections and a review of records.

The Remedial Investigation began with the collection of Phase I environmental samples from October through December 1996. Additional samples were added in September 1997. A Phase I Remedial Investigation report was issued in December 1997 which presented the analytical results and evaluated the potential human health risks associated with the NAWC facility. Based on these findings, additional Phase II samples were collected at selected areas during the spring and summer of 1998.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Involvement Plan (CIP)(May 1997) was developed for NAWC Indianapolis that identifies a program to establish communication and information exchange between the Navy, and various federal, state and local agencies, and community agencies; and the public. Specifically, this provides a mechanism for the exchange of information between the BRAC Cleanup Team (BCT) and the public, primarily through the Restoration Advisory Board (RAB). The BCT and RAB periodically hold public meetings to provide full exchange of information and to provide an opportunity for public comment.

The Navy solicited input from the community for the Proposed Plan on the selected alternative for each response action. The Navy originally set a public comment period from September 28, 1998 to October 27, 1998, and later extended it until November 11, 1998 to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998, from 7:00 PM to 9:00 PM at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis.

As indicated by the public notices, all documents pertinent to AOC 5 were made accessible to the public at the information repository located at the Warren Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

2.4 SCOPE AND ROLE OF ACTION

The sites that required environmental investigations as part of the Remedial Investigation at NAWC Indianapolis comprised eighteen areas of concern and one Installation Restoration (IR) site. This Decision Document addresses the contamination of the soil and groundwater associated with one AOC: AOC 5 - North - South Sanitary Sewer. This AOC was determined in the RI to be a relatively low risk site within the NAWC Indianapolis facility. The objective of the action described in this Decision Document is to maintain this low level of risk by controlling the site for non-residential uses. The AOC will be addressed independent of the other AOCs and the IR. The other AOCs will be addressed in other Decision Documents, and the basewide groundwater conditions will also be evaluated in a separate document.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Geology

The geology of AOC 5 is consistent with the geology found across the NAWC facility. The 10 borings drilled at AOCs 5 and 7, ranging in depth from 10 to 14 feet bgs, only partially penetrated through the unconsolidated surficial fill and glacial deposits. At AOC 5, brown topsoil and clayey silt was encountered from ground surface down to 1 foot bgs and yellow brown to gray silty clay was encountered from 1 foot bgs down to approximately 14 feet bgs. The geology observed in these areas may not be representative of these AOCs since the investigated areas were excavated to place sewers, manholes, and catch basins, and were later backflled.

2.5.2 Hydrogeology

No permanent monitoring wells were installed at AOC 5, thus hydraulic gradients, groundwater flow directions or velocity could not be determined at these sites. According to visual observations of the soil moisture content in subsurface soil samples, the water table was encountered between 6 and 13.5 feet bgs at AOC 5. Groundwater flow in the shallow aquifer is expected to mimic the basewide groundwater flow direction and the relatively flat surface topography and flow to the southeast. It is also believed that groundwater in the shallow aquifer will eventually discharge into Pleasant Run to the southeast.

2.5.3 Nature And Extent Of Contamination

This section presents the results of the sampling and analysis of environmental samples collected at AOC 5, the North-South Sanitary Sewer. The investigation of AOC 5 did not include the collection of groundwater data. All data generated by the fixed-base laboratory were validated according to EPA National and Region V guidelines.

Surface and subsurface soil samples were collected from four direct push soil borings located adjacent to sanitary sewer manholes located along a line running roughly south from the southwest quadrant of Building 1000 and east of Building 9500 to the southern perimeter of the property.

Three volatile organic compounds (VOCs) were detected at AOC 5, all at trace concentrations (1-2 µg/kg). All three VOCs (1,1,1 -trichloroethane, tetrachloroethene and trichloroethene) were detected in subsurface soil only. No other organic chemicals were detected in soils from this AOC.

Numerous metals were detected at each of the four soil sampling locations. However, the only metal detected at a concentration exceeding both background concentrations and one or more of the screening criteria was thallium in the surface sample from soil boring A05-DP003. The thallium concentrations at this location exceeded the criteria for the transfer from soil to groundwater, and marginally exceeded the background concentration. Because there is little evidence of soil contamination at this AOC, and because thallium would have been used at NAWC Indianapolis only in very small quantities relative to other metals and organic solvents, it is unlikely that the measured concentrations of thallium are due to the influence of the sanitary sewer.

2.6 SUMMARY OF SITE RISKS

During the RI, an analysis was conducted to estimate the health or environmental problems that could result if the soil contamination at AOC 5 was not mitigated. This analysis is commonly referred to as a baseline risk assessment. In conducting this assessment, the focus was on health effects that could result from exposure to the soil and groundwater contaminants in both an industrial and a residential setting. The industrial setting considered the exposure by on-site workers, construction workers and adolescent trespassers. Residential exposure considered on-site exposure to the soil by future use of the site as residential property. At AOC 5, thirteen soil samples were collected from five borings at the AOC, and no groundwater samples were collected. In samples collected during the RI, contaminants were detected in the soils at the AOC.

The concentrations were compared to risk assessment criteria for residential and non-residential use. Criteria that were used to evaluate direct contact exposures were EPA Region III Risk Based Concentrations (RBCs), EPA Region IX Preliminary Remediation Goals (PRGs), IDEM Tier II Goals, and site-specific background concentrations. In addition, EPA Generic Soil Screening Levels (SSLs) and IDEM Tier II Goals were used to evaluate the potential for a chemical to migrate from the soil to the groundwater. If a chemical concentration in soil was found to be greater than one of the criteria (or 10% of PRG or RBC in the case of non-carcinogens), then the chemical was designated as a Chemical Of Potential Concern (COPC) and was considered for further risk analysis. Concentrations of inorganic chemicals were also compared to site-specific background concentrations.

Based on the laboratory analyses, the only COPC detected in the soil was thallium (3.0 mg/kg maximum). The only criteria that was exceeded is the EPA Generic Soil Screening Level (SSL). The SSL criteria assumes residential use, and since the future anticipated uses of the site were assumed to be non-residential, the criteria is not applicable and the risk level was not evaluated further. None of the residential and non-residential criteria were exceeded. The most restrictive criteria that were used for determining the COPCs use a risk level of 1.0×10^{-6} in the calculation of the criteria. Thus, it was not necessary to calculate risk levels since the risk of exposure for any residential or non-residential receptor is less than the EPA criteria of 1.0×10^{-6}.

The available data suggested that the chemicals detected in the soil were not migrating off-site, therefore, risks based on off-site residential use of the groundwater were not evaluated. There are no on-site wells

and the area is serviced by a public water supplier so risks by on-site consumers (present or future) were not evaluated.

The planned future use of the site is industrial, so the risks based on those uses were given more consideration than residential use. Alternatives for addressing the site were based on the continued industrial use of the site.

A baseline ecological risk assessment was also performed. The ecological risk assessment compared soil sample analytical results to Ecological Screening Levels. Ecological Screening Levels are based on EPA Region III Biological Technical Advisory Group (BTAG) values and “B level” criteria developed by The Netherlands and the Province of Quebec. If a chemical concentration in soil was found to be greater than one of the criteria, then the chemical was designated as a COPC and was considered for further risk analysis. COPCs were then used to evaluate the risk to wildlife receptors by calculating hazard quotients using a simple food chain model developed by the EPA Emergency Response Team. Finally, site specific factors were examined to evaluate the likelihood that a COPC may actually pose a risk. Such factors include the COPC concentration relative to the background, frequency and magnitude of detections, relationship of average COPC concentration to screening level, area affected, probable bioavailability, and degree in which wildlife are expected to use the area. In addition to contaminants in the surface soil, contaminants in the groundwater were modeled to predict their concentrations in Pleasant Run. The predicted concentrations were compared to surface water criteria. Contaminants with concentrations above the surface water criteria were retained as COPCs. Following the evaluation of the above information, COPCs that were judged likely to pose a potential risk under the site conditions were identified as chemicals of concern for further evaluation.

Based on the results of the surface soil analyses, only antimony and thallium were identified as COPCs. The hazard quotients calculated by the model show that there is a potential risk to wildlife. A comparison of the antimony concentration to the background could not be made since antimony was not detected in background samples. The sample concentrations at AOC 5, however, were below the detection limit of the background samples. The maximum concentration of thallium, 3.3 mg/kg, was similar to the background concentration of 2.71 mg/kg. AOC 5 is located below buildings and in open grassy areas that provide little habitat. Thus, when the site-specific factors are considered, the ecological risks for the site are considered to be minimal. None of the COPCs are considered chemicals of concern, and no further ecological evaluation was made.

The summary of the analytical results and risk assessment tables from the RI report are included in Appendix A. A figure depicting the sample locations is also provided in Appendix A.

2.7 DESCRIPTION OF ALTERNATIVES

The alternatives for AOC 5 are presented below. Note that the RI for NAWC Indianapolis has been completed, but the Feasibility Study has not been developed. These alternatives were presented in the Proposed Plan (TtNUS, 1998). The alternatives that were considered are as follows:

- Alternative 1: No Action
- Alternative 2: Institutional Controls

2.7.1 Alternative 1: No Action

The “No Action” alternative is evaluated at every site to establish a baseline for comparison. Under this alternative, no further action would be taken to prevent exposure to the contamination in the soil.

There are no capital costs, operations and maintenance costs, and present worth costs associated with this alternative. There is no implementation time associated with this alternative.

2.7.2 Alternative 2: Institutional Controls

Institutional controls will be put in place to maintain the industrial use of the site. The alternative is consistent with the proposed use the property in the future. The institutional controls consists of deed restrictions that include:

- a clause restricting the land use to non-residential and specifically prohibiting uses such as, but not limited to, day care facilities and facilities for the elderly.

- a clause retaining the rights of access by the Navy, and Federal and State regulators for environmental investigations, inspections and/or remedial actions.

An Institutional Controls Plan (ICP) has been prepared to ensure the long term effectiveness of the institutional controls. The plan was developed according to EPA guidance. This plan includes a description of the areas controlled by the deed restrictions, description of site, identification of residual

risk(s) presented, types of ICs imposed, proposed deed language implementing ICs, party responsible for monitoring the integrity and effectiveness of imposed control(s), procedures for reporting and enforcing against IC violations, assurances regarding completion of the CERCLA five-year review process, IC recordation / notice requirements, and commitment to pre-transfer meeting.

Since contamination will remain on site and a remedial action, institutional controls, is implemented, a five-year review of the remedy is required. No routine monitoring is proposed for AOC 5 since the groundwater data, as reported in the RI report and Phase II Technical Memorandum, shows that there were no detections of contaminants above screening levels at sampling locations immediately downgradient of AOC 5.

There are no capital costs associated with this alternative although there will be some costs associated with routine administration and the five-year review (presented below). The implementation time to prepare and finalize the deed restriction language is estimated to be two months.

Note that this alternative does not employ any treatment or removal technologies. Human health and the environment is protected by this remedy without the need for further physical changes.

Total Five Year Costs(1)

	Total hours	Labor Costs	Airfare/Lodging per diem/auto costs	AOC 5(2) Costs
Routine Administration	10	$350		
Parcel Transfer				
Trip 1	12	$420	$556	
Trip 2	12	$420	$556	
Five Year Review	12	$420	$556	
Problem Resolution				
Number 1	12	$420		
Number 2	12	$420		
Total		$2,450	$1,668	$412

1 Total five year costs included costs associated with AOC 1, AOC 5, AOC 6, AOC 7, AOC 8, AOC 9, AOC 15, AOC 17, and AOC 18.
2 AOC 5 costs are based as a percentage (10%) of the total five year costs.

2..7.3 Other Alternatives

The current use of the facility and site is industrial. The intended future use of the site is industrial and the intended use of the facility is non-residential. Alternative 2 - Institutional Controls was evaluated and found to be protective of human health and the environment.

As required by the NCP, other alternatives were considered but were determined by the BCT to be not appropriate for the levels of contamination found at the AOC. Since Alternative 2 is protective of human health and the environment, no other alternatives were evaluated in detail. Other alternatives are variations of soil remediation, such as excavation and disposal. These alternatives share several general characteristics. All require capital expenditure for field work and disposal. All require an implementation time of six to twelve months for design, bidding, procurement, and site work.

Any of these other alternatives can be expected to be evaluated favorably with the nine criteria. However, the resulting protection of human health and environment is the same as the institutional controls. The costs for implementation of remediation alternatives provide no additional benefit compared to the institutional controls. Thus, a detailed evaluation of other alternatives was not made and other alternatives were not considered further.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The preferred alternative for AOC 5 is Alternative 2 - Institutional Controls. Based on current information, this alternative would appear to provide the best balance of trade-offs among the alternatives with respect to nine criteria that EPA uses to evaluate alternatives. This section profiles the performance of the preferred alternative against the nine criteria, noting how it compares to the other alternatives under consideration. The nine criteria are summarized below.

Overall Protection of Human Health and Environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Compliance with ARARs addresses whether or not a remedy will meet all of the Applicable or Relevant and Appropriate Requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Long-term effectiveness and performance refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies that may be employed in a remedy.

Short-term effectiveness refers to the speed which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

Cost includes capital and operations and maintenance costs.

State Acceptance indicates whether, based on its review of the RI and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance. Indicates whether interested persons in the community support, have reservations about, or oppose the preferred alternative.

2.8.1 Analysis

Overall Protection of Human Health and Environment. All of the alternatives, except for the "no action" alternative would provide adequate protection of human health and the environment by implementing institutional controls or by removing the contaminants. The preferred alternative would implement institutional controls to minimize contact with the contaminants.

Compliance with ARARs. The preferred alternative is in compliance with Federal and State ARARs.

Long-term effectiveness. The preferred alternative would be effective in the long run since the deed restrictions would be maintained through the implementation of an Institutional Controls Plan.

The “no action” alternative provides no long-term safeguards against exposure. Therefore, the alternative will not be considered further.

Reduction of toxicity, mobility, or volume through treatment. The preferred alternative offers no change in the toxicity, mobility or volume of contaminants.

Short-term effectiveness. The preferred alternative can be instituted in a relatively short time. There is no change in the situation while waiting for implementation.

Implementability. The preferred alternative has few administrative issues that will affect its implementation. Deed restrictions have been used in the past at other facilities.

Cost. The preferred alternative has no capital cost and no annual operations and maintenance costs. There are costs associated with the five year review.

State Acceptance. The preferred alternative is in compliance with States ARARs. The State has viewed the preferred alternative favorably.

Community Acceptance. Community acceptance is described in Section 3.0 Responsiveness Summary.

2.9 SELECTED REMEDY

The selected remedy will provide a satisfactory level of risk relative to the current and future intended uses of the site. The level of risk is maintained but with little expenditure. The selected remedy is believed to provide the best balance in trade-offs among the alternatives with respect to the evaluation criteria. The selected remedy, however, does not result in unrestricted use of the site and five-year review of the site will be required.

Alternatives that employ treatment or removal were not considered practical since the risk associated with the site is consistent with the intended future uses of the facility.

2.10 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical for this site. However, because treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 5 precludes a remedy in which contaminants would be treated effectively.

Because this remedy will result in the contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

3.0 RESPONSIVENESS SUMMARY

A Proposed Plan for AOC 5 was issued in September 1998. Subsequent to this, the Navy solicited input from the community on the selected alternative. The Navy set a public comment period from September 28, 1998 to October 27, 1998, which was later extended to November 11, 1998, to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998 from 7:00 PM to 9:00 PM at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis. As indicated by the public notice for the meeting, all documents pertinent to AOC 5 were made available to the public at the information repository located at the Western Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

3.1 COMMUNITY PREFERENCES

Comments were received from one person. The comments concurred with the deed restrictions to limit the land use to industrial, and expressed concern for the land use to be changed to residential or permit day care facilities without extensive investigation. The comments were general and did not specify an AOC.

3.2 INTEGRATION OF COMMENTS

As these comments only concurred with the selected remedies identified, no integration of these comments were warranted.

3.3 COMMENT RESOLUTION

Please refer to the following pages for USEPA and IDEM comments and resolutions. Note that 'Draft' comments were addressed in working meetings, by teleconference or in revised documents. A formal written response was not provided for these comments.

RECORD OF USEPA AND IDEM

COMMENTS AND RESOLUTIONS

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

Frank O'Bannon
Governor

John M. Hamilton
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.ai.org/idem

November 17, 1998

Mr. Carl Loop
SOUTHDIV NAVFACENGCOM
2155 Eagle Drive
North Charleston, SC 29419-9010

Dear Mr. Loop:

Re: IDEM staff comments regarding the Proposed Plans (PPs) for AOCs 1, 5, 6, 7, 8, 9, 15, 17, and 18

Staff of the Indiana Department of Environmental Management have reviewed the above referenced documents. Our review generated the following comments:

GENERAL COMMENTS:

Section 7.0 - Community Participation:
In paragraph 2, the third sentence should read: "The Proposed Plan meets the applicable or relevant and appropriate federal and state requirements." In addition, this section should explain how public comments will be addressed. Please verify if a copy of the administrative record is available at the Warren Branch Library. If this is not the case, delete the statement in the last paragraph of this section.

SPECIFIC COMMENTS:

AOC 5:

Section 2.2 - Site History:
The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement), is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

Figure 2-2:
The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

AOC 7:

Section 2.2 - Site History:
The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement) is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

Figure 2-2:
The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

CONCLUSION:

It is IDEM staff's understanding that Institutional Control Plans (ICPs) will be attached to the Proposed Plans/Decision Documents. Once these ICPs are approved by IDEM and the U.S. EPA, IDEM staff will issue concurrence with the subject PPs. If you have any questions regarding the above comments, please contact me at (317) 308-3133.

Sincerely,

Gabriele Hauer, Project Manager
Defense Environmental Restoration Program
Office of Environmental Response

GHH:mg
cc: Rex Osborn, DERP, IDEM
Denise Boone, U.S. EPA Region V
Mark Sladic, Tetra Tech NUS
Joe Logan, Tetra Tech NUS
Alan Shoultz, Navy-Southdiv.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SRF-5J

December 1, 1998

Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Proposed Plans for Areas of Concern 1, 5, 6, 7, 8, 9, 15, 17 and 18 for the Naval Air Warfare Center, Indianapolis, Indiana.

Dear Mr. Loop:

The United States Environmental Protection Agency (USEPA) has reviewed the Proposed Plans for Areas of Concern (AOCs) 1, 5, 6, 7, 8, 9, 15, 17 and 18 for the Naval Air Warfare Center (NAWC), Indianapolis, Indiana. The preferred alternatives that the Navy has chosen for each of the AOCs are acceptable. However, the Navy must realize that there are costs associated with institutional controls (ICs) that are deed restrictions. The Navy must include an estimate of the costs for ICs.

The USEPA will not concur until the following are completed: the community acceptance of the preferred alternative, the Institutional Control Plan(s), and the finalized decision documents.

If the Navy as the lead agency reevaluates their preferred alternative for the AOCs, changes a component of the preferred remedy, or chooses to implement a remedy other than the preferred alternative, any such changes must be made in accordance with CERCLA Section 117(b).

If you have any questions concerning this letter, please feel free to contact me at (312) 886-6217.

Sincerely,

Denise Boone

Denise Boone
Remedial Project Manager

cc: Gabriele Hauer, IDEM

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 03-9-043

March 5, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for AOC 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

In accordance with your request, please find enclosed three copies of the finalized Decision Document for AOC 1. The second part of the AOC 1 Decision Document submittal is the Institutional Control Manual and ICP for AOC 1. We believe the ICM is compliant with the most recent information provided by U.S. EPA. Upon regulatory concurrence, it is the Navy's intent to proceed as quickly as possible to complete the Decision Documents for the other AOCs in Parcel 1. These include AOCs 5, 6, 7, 8, 9, 15, 17, and 18.

Additionally, please see responses to IDEM comments. EPA said in a December 1, 1998 letter that they would not provide comments prior to community acceptance, completion of an ICP and finalized DD. The Navy feels these conditions have now all been met.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/gp

Enclosures

cc: Gabriele Hauer, IDEM
Denise Boone, USEPA
Alan Shoultz (w/o enclosures)
File 7173

IDEM COMMENTS REGARDING PROPOSED PLANS (PPs) FOR AOCs 1,5,6,7,8, 9, 15, 17, and 18

GENERAL COMMENTS:

1. **COMMENT:** **Section 7.0 - Community Participation**: In paragraph 2, the third sentence should read: "The Proposed Plan meets the applicable or relevant and appropriate federal and state requirements." In addition, this section should explain how public comments will be addressed. Please verify if a copy of the administrative record is available at the Warren Branch Library. If this is not the case, delete the statement in the last paragraph of this section.

   RESPONSE

a. The Navy agrees. This sentence in question some how got truncated and was missed. This will be corrected in the Decision Document.

b. A paragraph stating how the public comments will be addressed is located at the top of page 7-2. This is compliant with the EPA ROD guidance. No changes to the text are necessary.

c. A copy of the Administrative Record is located in the Warren Branch Library.

SPECIFIC COMMENTS:

AOC5:

1. **COMMENT:** **Section 2.2 - Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement), is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT Figure 2.2.** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

AOC 7:

1. **COMMENT:** **Section 2.2 - Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines and the land around the sewer lines (easement) is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy Agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT:** **Figure 2-2:** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 08-9-050

August 6, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for Parcel 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

Please find enclosed three copies of change pages for the Parcel 1 AOCs.

1. **Instructions for the material attached to this letter**: Pursuant to their letter dated July 28, regarding the Decision Documents for this site, the EPA has requested that a copy of the USEPA's and the Indiana Department of Environmental Management's. (IDEM) comments on the proposed plan/DD and the Navy's responses to the comments be included with these documents. Therefore, please replace the following pages:

   - The updated table of contents (identifying Section 3.3 Comment Resolution), and,
   - Page 3-1

   Following Page 3-1, please insert the pages following the title page 'USEPA and IDEM Comments and Resolutions.' Note that the content of each group is identical, however the contents page and page 3-1 contain a header in the upper right corner which indicate which section the change pages should be inserted in.

   As the remedy for AOC 6 and AOC 8 are 'no further action', these AOCs do not have change pages. This is consistent with EPA's July 28 letter.

2. **Schedule**: The Navy believes that the absence of these comment letters has not presented a material hurdle to completion of the regulatory review for these documents. The team schedule specified that following a 30-day regulatory review period, the date of concurrence on the Decision Documents was to be August 5. The Navy would appreciate if the EPA can now remove the signature pages from one set of the Decision Documents and sign these in the appropriate locations. Afterwards, please forward

these to the IDEM for signature. Following IDEM signature, the Navy requests that IDEM please forward them to Southdiv, attention Carl Loop, for final signature. When Southdiv returns the signed pages to us, we will provide copies for inclusion in all outstanding sets of Decision Documents.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/kf

Enclosures

cc: Sean Grady, IDEM (w/enclosure)
Gary Schafer, USEPA (w/enclosure)
Alan Shoultz (w/o enclosures)
Mark Perry, TtNUS (w/enclosure)
Debra Wroblewski/DER, TtNUS (w/o enclosures)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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August 17, 1999

Mr. Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

Dear Mr. Loop:

Re: Decision Document for Areas of Concern #5, 6, 7, 8, 9, 15, 17, and 18 for the Naval Air Warfare Center, Indianapolis, Indiana

Staff of the Indiana Department of Environmental Management (IDEM) have reviewed the above referenced document and has determined that it is acceptable providing the Navy address the following comments:

GENERAL COMMENT

An executive summary should be incorporated to give the readers an understanding of what this document is and why it was developed. Also, the title of this report should be changed to more accurately reflect the parcel name.

SPECIFIC COMMENTS

AOC 6, Page 2-13, Section 2.9: Some language in this section is not needed. Since there was no contamination, no risk, and no action is required for this AOC, the second sentence in the first paragraph continuing through the end of the page should be removed. Revision of this section may be needed.

AOC 8, Page 2-13, Section 2.9: Again, some language in this section is not needed. Since there was no contamination, no risk, and no action is required for this AOC, the third sentence in the first paragraph continuing through the end of the page should be removed. Revision of this section may be needed.

If you have any questions concerning this letter, please feel free to contact me at (317) 308-3121.

Sincerely,

Sean K. Grady, Project Manager
Federal Programs Section
Office of Environmental Response

SKG:mg
cc: Alan Shoultz, SOUTHDIV
Mark Sladic, Tetra Tech NUS
Denise Boone, U.S. EPA

REFERENCES

B&R Environmental, March 1996, Environmental Baseline Survey - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, June 1996. Community Relations Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, August 1996. Finding of Suitability to Lease and Environmental Baseline Survey for Lease - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, October 1996. Remedial Investigation Work Plan - Naval Air Warfare Center Indianapolis, Indiana.

Supporting documents: Field Sampling Plan
Health and Safety Plan
Quality Assurance Project Plan

B&R Environmental, November 1996. DRAFT Data Management Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, November 1997. Phase I Remedial Investigation Report - Revision 1 - Naval Air Warfare Center Indianapolis, Indiana

IDEM (Indiana Department of Environmental Management), October 1995. Voluntary Remediation Program Resource Guide. Office of Environmental Response.

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Tetra Tech NUS, Inc., September 1998, Proposed Plan for AOC 5 - North-South Sanitary Sewer - Naval Air Warfare Center Indianapolis, Indiana.

Tetra Tech NUS, Inc., November 1998, Phase I and II Remedial Investigation Report - Revision 2 - Naval Air Warfare Center Indianapolis, Indiana.

U.S. EPA (United States Environmental Protection Agency), 1989. Guidance on Preparing Superfund Decision Documents - Interim Final. EPA/540/G-89/007. Office of Emergency and Remedial Response, Washington, DC.

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AOC 5

APPENDIX A

REMEDIAL INVESTIGATION REPORT LABORATORY DATA, RISK ASSESSMENT TABLES AND SAMPLE LOCATION FIGURE

TABLE 10-3
SUMMARY OF POSITIVE DETECTIONS IN SURFACE AND SUBSURFACE SOIL
AOC 5 - NORTH-SOUTH SANITARY SEWER
NAVAL AIR WAREFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	BACKGROUND	A05DP00101	A05DP00301	A05DP00302	A05DP00303	A05DP00303-D	A05DP00401	A05DP00402	A05DP00403	A05DP00501
SAMPLE DATE:		10/29/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96
PHASE:		I	I	I	I	I	I	I	I	I
BORING:		AOC05DP01	AOC05DP03	AOC05DP03	AOC05DP03	AOC05DP03	AOC05DP04	AOC05DP04	AOC05DP04	AOC05DP05
AOC:		A05	A05	A05	A05	A05	A05	A05	A05	A05
DEPTH:		10 - 14	0 - 2	2 - 6	6 - 10	6 - 10	0 - 2	2 - 6	6 - 10	0 - 2
FIELD DUPLICATE OF:						A05DP00303				
VOLATILES (ug/kg)										
1,1,1-TRICHLOROETHANE		11 U	12 U	12 U	12 U	2 J	12 U	12 U	11 U	12 U
TETRACHLOROETHENE		1 J	12 U	12 U	12 U	11 U	12 U	12 U	11 UJ	12 U
TRICHLOROETHENE		2 J	12 U	12 U	12 U	11 U	12 U	12 U	11 U	12 U
METALS (mg/kg)										
ALUMINUM	22217	3880 J	15000 J	15200 J	10300 J	13300 J	12800 J	14100 J	4160 J	12300 J
ANTIMONY	NA	0.74 J*	1.1 J*	11.8 U	12.5 U	12.6 U	11.9 U	11.3 U	9.5 U	10.4 U
ARSENIC	21.3	8.6 J	10.5 J	13.5	7	7.1	7	8.1	5.1	6.8
BARIUM	222	21.5 J	181 J	185 J	78.3 J	168 J	122 J	130 J	49.6 J	85.8 J
BERYLLIUM	1.13	0.24	0.82	0.87	0.52	0.76	0.79	0.78	0.25	0.66
CADMIUM	NA	1.8 U	0.7 UJ	1.3 *	0.72 U	0.73 U	0.7 *	0.65 U	0.55 U	0.6 U
CALCIUM	914377	83400 J	3820 J	4230 J	4780 J	4580 J	3790 J	4610 J	104000 J	4710 J
CHROMIUM	27.1	6.4 J	24.2 J	27.5 J*	17.1 J	20.3 J	19.2 J	27.6 *	9.3 J	17.6 J
COBALT	22.5	4.7 J	8.9 J	12.7 J	5.1 J	10.5 J	7.7 J	8.5 J	6.3 J	4.3 J
COPPER	30.3	12.2 J	17.9 J	35.9 *	22.7	20.9	19	26.1	16.1	18.7
IRON	30170	13800 J	25400 J	30000 J	19000 J	27200 J	21600 J	23900 J	14400 J	23900 J
LEAD	61.7	6.1 J	14.1 J	9.4 J	7.2 J	14.7 J	9 J	14.7 J	3.5 J	12.4 J
MAGNESIUM	157362	24100 J	3650 J	5010 J	4290 J	3920 J	3020 J	4160 J	31500 J	2970 J
MANGANESE	2130	213 J	495 J	1100 J	235 J	1040 J	447 J	466 J	362 J	101 J
MERCURY	0.194	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U
NICKEL	108	12.1 U	17.4	45 J	22.1 J	33 J	22.4 J	28 J	22.5 J	16.8 J
POTASSIUM	1832	764	960	1180 J	998 J	872 J	793 J	1160 J	833 J	934 J
SODIUM	120	102 J	43.4 U	83 U	65.1 U	56.9 U	61.1 U	57 U	117 U	60.3 U
THALLIUM	2.71	1.5 J	3 *	1.4 UJ	1.4 UJ	1.5 UJ	1.4 UJ	1.3 UJ	1.1 UJ	1.2 UJ
VANADIUM	51.3	12.7 J	34.9	37.7 J	22.8 J	26.8 J	30.4 J	29 J	12.4 J	27.5 J
ZINC	113	47.6 J	64.4	91.3 J	70.5 J	69.6 J	55.1 J	84 J	49.4 J	56.1 J

Background value for inorganics are the 95% Upper Tolerance Limit (UTL) which is based on the background date set.
*** - Indicates the concentration exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 10-3
SUMMARY OF POSITIVE DETECTIONS IN SURFACE AND SUBSURFACE SOIL
AOC 5 - NORTH-SOUTH SANITARY SEWER
NAVAL AIR WAREFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: **SAMPLE DATE:** **PHASE:** **BORING:** **AOC:** **DEPTH:** **FIELD DUPLICATE OF:**	**BACKGROUND**	**A05DP00502** **11/12/96** **I** **AOC05DP05** **AO5** **2 - 6**	**A05DP00503** **11/12/96** **I** **AOC05DP05** **A05** **6 - 10**							
VOLATILES (ug/kg)										
1,1,1-TRICHLOROETHANE		12 U	2 J							
TETRACHLOROETHENE		12 UJ	12 U							
TRICHLOROETHENE		12 U	8 U							
METALS (mg/kg)										
ALUMINUM	22217	6530 J	5310 J							
ANTIMONY	NA	10.8 U	10.2 U							
ARSENIC	21.3	6.6	4.3							
BARIUM	222	97.7 J	44.3 J							
BERYLLIUM	1.13	0.44	0.2							
CADMIUM	NA	0.94 *	0.59 U							
CALCIUM	914377	12100 J	145000 J							
CHROMIUM	27.1	12.5 J	3.9 J							
COBALT	22.5	6.6 J	3.9 J							
COPPER	30.3	17.5	8.8 J							
IRON	30170	20600 J	11800 J							
LEAD	61.7	22.5 J	3.4 J							
MAGNESIUM	157362	5520 J	81100 J							
MANGANESE	2130	486 J	200 J							
MERCURY	0.194	0.06	0.05 U							
NICKEL	108	14.3 J	9.1 J							
POTASSIUM	1832	895 J	1820 J							
SODIUM	120	73.2 U	277 U							
THALLIUM	2.71	1.2 UJ	2 J							
VANADIUM	51.3	19.9 J	14.8 J							
ZINC	113	56.7 J	31.7 J							

Background value for inorganics are the 95% Upper Tolerance Limit (UTL) which is based on the background date set.
*** - Indicates the concentration exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

Data validation was conducted in accordance with EPA National Functional Guidelines for Organic and Inorganic Data Review and EPA Region V guidelines. The following data qualifiers were used during the data review process:

- U - Indicates that the analyte was not detected at the numerical detection limit. Nondetected results reported by the laboratory and positive results qualified due to laboratory or field blank contamination (false positives) are reported using this qualifier.

- BU - Indicates that the analyte was detected in the associated method blank but the result is considered to be a false positive as a result of method blank contamination.

- BJ - Indicates that the analyte was detected in the associated laboratory method blank. The stated result is qualified as estimated since the concentration exceeds the validation blank action level.

- UJ - Indicates that the analyte was not detected. However, the detection limit is estimated as a result of a noncompliance encountered during laboratory analysis. The associated detection limit is regarded as imprecise.

- J - Indicates that the analyte was detected and the associated numerical result is estimated or imprecise.

- UR - Indicates that the laboratory did not detect the analyte. However, the nondetected analyte is considered unreliable and unusable as a result of a gross technical deficiency.

- R - Indicates that the laboratory detected the analyte. However, the positive result is considered unreliable and unusable as a result of a gross technical deficiency.

The above qualifications are generally categorized as major and minor problems or deficiencies. Major problems are defined as those, which result in the rejection of a data. Such results are qualified either as R or UR. Minor problems are defined as those, which result in the estimation of a given data point. The following qualifiers identify data qualified as a consequence of minor problems: BU, BJ, UJ, and J.

TABLE 10-8

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 5 - NORTH-SOUTH SANITARY SEWER - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Residential	EPA Region IX Preliminary Risk-Based Goals (3) Residential	Indiana Tier II Cleanup Goals (4) Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Metals (mg/kg)												
ALUMINUM	3/3	12300 - 15000	15000	13367	A05DP00301	7800	7500	—	—	22217	No	BKG
ANTIMONY	1/3	1.1	1.1	1.1	A05DP00301	3.1	3	108	—	ND	No	BSL
ARSENIC	3/3	6.8 - 10.5	10.5	8.1	A05DP00301	0.43	0.38	81	750	21.3	No	BKG
BARIUM	3/3	85.8 - 181	181	130	A05DP00301	55	52	10000	690000	222	No	BKG
BERYLLIUM	3/3	0.66 - 0.82	0.82	0.757	A05DP00301	16	0.14	0.5	1300	1.13	No	BKG
CADMIUM	1/3	0.7	0.7	0.7	A05DP00401	3.9	3.7	135	1800	ND	No	BSL
CALCIUM	3/3	3790 - 4710	4710	4107	A05DP00501	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	3/3	17.6 - 24.2	24.2	20.3	A05DP00301	12000 (7)	210	10000	—	27.1	No	BKG, BSL
COBALT	3/3	4.3 - 8.9	8.9	6.97	A05DP00301	470	330	—	—	22.5	No	BKG, BSL
COPPER	3/3	17.9 - 19	19	18.5	A05DP00401	310	280	—	—	30.3	No	BKG, BSL
IRON	3/3	21600 - 25400	25400	23633	A05DP00301	2300	2200	—	—	30170	No	BKG, NUT
LEAD	3/3	9 - 14.1	14.1	11.8	A05DP00301	400 (8)	400	—	—	61.7	No	BKG, BSL
MAGNESIUM	3/3	2970 - 3650	3650	3213	A05DP00301	—	—	—	—	157362	No	BKG, NUT
MANGANESE	3/3	101 - 495	495	348	A05DP00301	160	310	—	—	2130	No	BKG
NICKEL	3/3	16.8 - 22.4	22.4	18.9	A05DP00401	160	150	5400	13000	108	No	BKG, BSL
POTASSIUM	3/3	793 - 960	960	896	A05DP00301	—	—	—	—	1832	No	BKG, NUT
THALLIUM	1/3	3	3	3	A05DP00301	0.55	0.52	—	—	120	No	BKG
VANADIUM	3/3	27.5 - 34.9	34.9	30.9	A05DP00301	55	52	1890	—	51.3	No	BKG, BSL
ZINC	3/3	55.1 - 64.4	64.4	58.5	A05DP00301	2300	2200	10000	—	113	No	BKG, BSL

Notes:
1 - Data from the following sampling locations were included in the screening process: A05DP00301, A05DP00401, A05DP00501
2 - U.S. EPA Region III Risk-based Concentration Table, April 12,1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - OSWER screening level.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-9

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NONRESIDENTIAL LAND USE SCENARIO
AOC 5 - NORTH-SOUTH SANITARY SEWER - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) NonResidential	EPA Region IX Preliminary Risk-Based Goals (3) NonResidential	Indiana Tier II Cleanup Goals (4) Non Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? NonResidential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Metals (mg/kg)												
ALUMINUM	3/3	12300 - 15000	15000	13367	A05DP00301	200000	100000	—	—	22217	No	BKG, BSL
ANTIMONY	1/3	1.1	1.1	1.1	A05DP00301	82	75	816	—	ND	No	BSL
ARSENIC	3/3	6.8 - 10.5	10.5	8.1	A05DP00301	3.8	3	612	750	21.3	No	BKG
BARIUM	3/3	85.8 - 181	181	130	A05DP00301	14000	100000	10000	690000	222	No	BKG, BSL
BERYLLIUM	3/3	0.66 - 0.82	0.82	0.757	A05DP00301	410	1.2	13.49	1300	1.13	No	BKG, BSL
CADMIUM	1/3	0.7	0.7	0.7	A05DP00401	100	93	1020	1800	ND	No	BSL
CALCIUM	3/3	3790 - 4710	4710	4107	A05DP00501	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	3/3	17.6 - 24.2	24.2	20.3	A05DP00301	310000 (7)	450	10000	—	27.1	No	BKG, BSL
COBALT	3/3	4.3 - 8.9	8.9	6.97	A05DP00301	12000	2900	—	—	22.5	No	BKG, BSL
COPPER	3/3	17.9 - 19	19	18.5	A05DP00401	8200	7000	—	—	30.3	No	BKG, BSL
IRON	3/3	21600 - 25400	25400	23633	A05DP00301	61000	100000	—	—	30170	No	BKG, BSL, NUT
LEAD	3/3	9 - 14.1	14.1	11.8	A05DP00301	—	1000	—	—	61.7	No	BKG, BSL
MAGNESIUM	3/3	2970 - 3650	3650	3213	A05DP00301	—	—	—	—	157362	No	BKG, NUT
MANGANESE	3/3	101 - 495	495	348	A05DP00301	4100	4500	—	—	2130	No	BKG, BSL
NICKEL	3/3	16.8 - 22.4	22.4	18.9	A05DP00401	4100	3700	10000	13000	108	No	BKG, BSL
POTASSIUM	3/3	793 - 960	960	896	A05DP00301	—	—	—	—	1832	No	BKG, NUT
THALLIUM	1/3	3	3	3	A05DP00301	14	13	—	—	120	No	BKG, BSL
VANADIUM	3/3	27.5 - 34.9	34.9	30.9	A05DP00301	1400	1300	10000	v	51.3	No	BKG, BSL
ZINC	3/3	55.1 - 64.4	64.4	58.5	A05DP00301	61000	100000	10000		113	No	BKG, BSL

Notes:
1 - Data from the following sampling locations were included in the screening process: A05DP00301, A05DP00401, A05DP00501
2 - U.S. EPA Region III Risk-based Concentration Table, April 12,1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - OSWER screening level.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-10

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 5 - NORTH-SOUTH SANITARY SEWER - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Residential	EPA Region IX Preliminary Risk-Based Goals (3) Residential	Indiana Tier II Cleanup Goals (4) Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatiles (ug/kg)												
1,1,1-TRICHLOROETHANE	2/7	2 - 2	2	2	A05DP00503, A05DP00303-MAX	160000	68000	1000000	1200000	ND	No	BSL
TETRACHLOROETHENE	1/7	1	1	1	A05DP00101	12000	4700	1000000	11000	ND	No	BSL
TRICHLOROETHENE	1/7	2	2	2	A05DP00101	58000	2700	437110	5000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	7/7	3680 - 15200	15200	8926	A05DP00302	7800	7500	—	—	22217	No	BKG
ANTIMONY	1/7	0.74	0.74	0.74	A05DP00101	3.1	3	584	—	ND	No	BSL
ARSENIC	7/7	4.3 - 13.5	10.8	7.61	A05DP00302	0.43	0.38	438	750	21.3	No	BKG
BARIUM	7/7	21.5 - 185	146	99.4	A05DP00302	550	520	102200	690000	222	No	BKG, BSL
BERYLLIUM	7/7	0.2 - 0.87	0.87	0.506	A05DP00302	16	0.14	118.6	1300	1.13	No	BKG
CADMIUM	2/7	0.94 - 1.3	1.3	1.12	A05DP00302	3.9	3.7	730	1800	ND	No	BSL
CALCIUM	7/7	4230 - 145000	145000	51160	A05DP00503	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	7/7	3.9 - 27.6	27.6	15.4	A05DP00402	12000 (7)	210	10000	—	27.1	No	BSL
COBALT	7/7	3.9 - 12.7	11.5	7.6	A05DP00302	470	330	—	—	22.5	No	BKG, BSL
COPPER	7/7	8.6 - 35.9	32.3	19.9	A05DP00302	310	280	—	—	30.3	No	BSL
IRON	7/7	11900 - 30000	25471	20243	A05DP00302	2300	2200	—	—	30170	No	BKG, NUT
LEAD	7/7	3.4 - 22.5	22.5	10.6	A05DP00502	400 (8)	400	—	—	61.7	No	BKG, BSL
MAGNESIUM	7/7	4160 - 81100	81100	22240	A05DP00503	—	—	—	—	157362	No	BKG, NUT
MANGANESE	7/7	200 - 1100	1100	552	A05DP00302	160	310	—	—	2130	No	BKG
MERCURY	1/7	0.06	0.040	0.06	A05DP00502	2.3 (9)		87.6	10	0.194	No	BKG, BSL
NICKEL	6/7	9.1 - 45	32.8	25.3	A05DP00302	160	150	29200	13000	108	No	BKG, BSL
POTASSIUM	7/7	764 - 1820	1410	1093	A05DP00503	—	—	—	—	1832	No	BKG, NUT
SODIUM	1/7	102	102	102	A05DP00101	—	—	—	—	5.46	No	NUT
THALLIUM	2/7	1.5 - 2	1.60	1.75	A05DP00503	0.55	0.52	—	—	120	No	BKG
VANADIUM	7/7	12.4 - 37.7	33.8	21.9	A05DP00302	55	52	10220	—	51.3	No	BKG, BSL
ZINC	7/7	31.7 - 91.3	77.3	61.6	A05DP00302	2300	2200	438000	—	113	No	BKG, BSL

Notes:

1 - Data from the following sampling locations were included In the screening process: A05DP00101, A05DP00302, A05DP00303-MAX, A05DP00402, A05DP00403, A05DP00502, A05DP00503
2 - U.S. EPA Region III Risk-based Concentration Table, April 12,1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1. 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes
Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - OSWER screening level.
9 - Value is for mercuric chloride.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-11

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NONRESIDENTIAL LAND USE SCENARIO
AOC 5 - NORTH-SOUTH SANITARY SEWER - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) NonResidential	EPA Region IX Preliminary Risk-Based Goals (3) NonResidential	Indiana Tier II Cleanup Goals (4) NonResidential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? NonResidential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatiles (ug/kg)												
1,1,1-TRICHLOROETHANE	2/7	2 - 2	2	2	A05DP00503, A05DP00303-MAX	4100000	1400000	1000000	1200000	ND	No	BSL
TETRACHLOROETHENE	1/7	1	1	1	A05DP00101	110000	16000	1000000	11000	ND	No	BSL
TRICHLOROETHENE	1/7	2	2	2	A05DP00101	520000	6100	437110	5000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	7/7	3880 - 15200	15200	8926	A05DP00302	200000	100000	—	—	22217	No	BKG, BSL
ANTIMONY	1/7	0.74	0.74	0.74	A05DP00101	82	75	584		ND	No	BSL
ARSENIC	7/7	4.3 - 13.5	10.8	7.61	A05DP00302	3.8	3	438	750	21.3	No	BKG
BARIUM	7/7	21.5 - 185	146	99.4	A05DP00302	14000	100000	102200	690000	222	No	BKG, BSL
BERYLLIUM	7/7	0.2 - 0.87	0.87	0.506	A05DP00302	410	1.2	118.6	1300	1.13	No	BKG, BSL
CADMIUM	2/7	0.94 - 1.3	1.3	1.12	A05DP00302	100	93	730	1800	ND	No	BSL
CALCIUM	7/7	4230 - 145000	145000	51160	A05DP00503	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	7/7	3.9 - 27.6	27.6	15.4	A05DP00402	310000 (7)	450	10000	—	27.1	No	BSL
COBALT	7/7	3.9 - 12.7	11.5	7.6	A05DP00302	12000	2900	—	—	22.5	No	BKG, BSL
COPPER	7/7	8.8 - 35.9	32.3	19.9	A05DP00302	8200	7000	—	—	30.3	No	BSL
IRON	7/7	11800 - 30000	25471	20243	A05DP00302	61000	100000	—	—	30170	No	BKG, BSL, NUT
LEAD	7/7	3.4 - 22.5	22.5	10.6	A05DP00502	—	1000	—	—	61.7	No	BKG, BSL
MAGNESIUM	7/7	4160 - 81100	81100	22240	A05DP00503	—	—	—	—	157362	No	BKG, NUT
MANGANESE	7/7	200 - 1100	1100	552	A05DP00302	4100	4500	—	—	2130	No	BKG, BSL
MERCURY	1/7	0.08	0.040	0.08	A05DP00502	61 (8)		87.6	10	0.194	No	BKG, BSL
NICKEL	6/7	9.1 - 45	32.8	25.3	A05DP00302	4100	3700	29200	13000	108	No	BKG, BSL
POTASSIUM	7/7	764 - 1820	1410	1093	A05DP00503	—	—	—	—	1832	No	BKG, NUT
SODIUM	1/7	102	102	102	A05DP00101	—	—	—	—	5.46	No	NUT
THALLIUM	2/7	1.5 - 2	1.60	1.75	A05DP00503	14	13	—	—	120	No	BKG, BSL
VANADIUM	7/7	12.4 - 37.7	33.8	21.9	A05DP00302	1400	1300	10220	—	51.3	No	BKG, BSL
ZINC	7/7	31.7 - 91.3	77.3	61.6	A05DP00302	61000	100000	438000	—	113	No	BKG, BSL

Notes:

1 - Data from the following sampling locations were included in the screening process: A05DP00101, A05DP00302, A05DP00303-MAX, A05DP00402, A05DP00403, A05DP00502, A05DP00503
2 - U.S. EPA Region III Risk-based Concentration Table, April 12, 1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1. 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes
Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - Value is for mercuric chloride.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-12

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER PROTECTION EVALUATION
AOC 5 - THE NORTH-SOUTH SANITARY SEWER - SURFACE AND SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Maximum Concentration (1)		Indiana Tier II Cleanup Goals (2)		EPA Region IX Soil Screening Level (3)	Upper Tolerance Limit for Background	Selected as a COPC?	
	Surface Soil	Subsurface Soil	Non Residential	Residential	Soil to Groundwater		Industrial Yes or No	Residential Yes or No
Volatile Organic Compounds (ug/kg)								
1,1,1-trichloroethane	ND	2	1000000	229642	2000	ND	No	No
Tetrachloroethene	ND	1	8010	227	60	ND	No	No
Trichloroethene	ND	2	25730	76	60	ND	No	No
Metals (mg/kg)								
Aluminum	15000	15200	—	—	—	22217	NC	NC
Antimony	1.1	0.74	—	—	5	ND	No	No
Arsenic	10.5	13.5	—	—	29	21.3	No	No
Barium	181	185	—	—	1600	222	No	No
Beryllium	0.82	0.87	—	—	63	1.13	No	No
Cadmium	0.7	1.3	—	—	8	ND	No	No
Calcium	4710	145000	—	—	—	914377	NC	NC
Chromium	24.2	27.6	—	—	38	27.1	No	No
Cobalt	8.9	12.7	—	—	—	22.5	NC	NC
Copper	19	35.9	—	—	—	30.3	NC	NC
Iron	25400	30000	—	—	—	30170	NC	NC
Lead	14.1	22.5	—	—	—	61.7	NC	NC
Magnesium	3650	81100	—	—	—	157362	NC	NC
Manganese	495	1100	—	—	—	2130	NC	NC
Mercury	ND	0.06	—	—	—	0.194	NC	NC
Nickel	22.4	45	—	—	130	108	No	No
Potassium	960	1820	—	—	—	1832	NC	NC
Sodium	ND	102	—	—	—	120	NC	NC
Thallium	3	2	—	—	0.7	2.71	Yes	Yes
Vanadium	34.9	37.7	—	—	6000	51.3	No	No
Zinc	64.4	91.3	—	—	12000	113	No	No

NOTES:
1 - Date from to following sampling locations were included in to screening process: A05DP00101, A05DP00201, A05DP00202, A05DP00203, A05DP00301, A05DP00302, A05DP00303-MAX, A05DP00401, A05DP00402, A05DP00403, A05DP00501, A05DP00502, A05DP00503.
(2) - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
(3) - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
Shaded bolded values indicate an exceedance of criteria.
ND - Not Detected
COPC -Chemicals of Potential Concern.
NC - No criteria available.

TABLE 10-18

CHEMICALS RETAINED AS COPCs
AOC 5 - THE NORTH SOUTH SANITARY SEWER
NAVAL AIR WARFARE CENTER
MARION COUNTY, INDIANA

	Surface Soil		Subsurface Soil		Soil to Air		Soil to Groundwater	
Chemical	**Residential**	**Non-Residential**	**Residential**	**Non-Residential**	**Surface Soil**	**Subsurface Soil**	**Residential**	**Non-Residential**
Metals								
Thaillium							X	X

Notes:
An X indicates that the maximum detected concentration exceeded the screening criteria.

TABLE 10-19

TERRESTRIAL FLORA AND INVERTEBRATE FAUNA COPC SELECTION TABLES - AOC 5
PHASE I AND II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER, INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection	Range of Detections			Location of Maximum	Ecological Screening Level (1)	Number Exceeding Screening Level	Background Concentration	Number Exceeding Background Concentration	Selected as a COPC?	Rational
		Min.	Max.	Avg. All							
Volatile Organics (ug/kg)											
TETRACHLOROETHENE	1/5	1.0	1.0	1.0	AOC05DP01	2005	0	ND	NA	N	Below Screening Value
TRICHLOROETHENE	1/5	2.0	2.0	2.0	AOC05DP01	3000	0	ND	NA	N	Below Screening Value
Inorganics (mg/kg)											
ALUMINUM	5/5	3880	15000	11516	AOC05DP0103	50	5	22217	0	N	Below background
ANTIMONY	3/5	0.14	1.1	1.1	AOC05DP0103	5	0	ND	NA	N	Below Screening Value
ARSENIC	5/5	6.8	14.9	9.6	AOC05DP0102	19	0	21.3	0	N	Below Screening Value
BARIUM	5/5	21.5	181	105	AOC05DP0103	412.5	0	222	0	N	Below Screening Value
BERYLLIUM	5/5	0.14	0.14	0.1	AOC05DP0103	10	0	1.13	0	N	Below Screening Value
CADMIUM	2/5	0.14	0.14	0.1	AOC05DP0102	3.8	0	ND	NA	N	Below Screening Value
CALCIUM	5/5	3570	83400	19858	AOC05DP01	NV	NA	914377	0	N	Low toxicity
CHROMIUM	5/5	6.4	24.2	17.7	AOC05DP0103	64	0	27.1	0	N	Below Screening Value
COBALT	5/5	4.3	9.4	7.0	AOC05DP0102	130	0	22.5	0	N	Below Screening Value
COPPER	5/5	12.2	19.0	17.4	AOC05DP0102, AOC05DP0104	63	0	30.3	0	N	Below Screening Value
IRON	5/5	13800	29000	22740	AOC05DP0102	NV	NA	30170	0	N	Below background
LEAD	5/5	6.1	17.7	11.9	AOC05DP0102	70	0	61.7	0	N	Below Screening Value
MAGNESIUM	5/5	2970	24100	7420	AOC05DP01	NV	NA	157362	0	N	Low toxicity
MANGANESE	5/5	101	495	308	AOC05DP0103	500	0	2130	0	N	Below Screening Value
NICKEL	4/5	16.8	22.7	17.1	AOC05DP0102	122.5	0	108	0	N	Below Screening Value
POTASSIUM	5/5	764	1260	942	AOC05DP0102	NV	NA	1832	0	N	Low toxicity
SODIUM	2/5	102	798	196	AOC05DP0102	NV	NA	120	1	N	Low toxicity
THALLIUM	3/5	1.5	3.3	1.8	AOC05DP0102	1	3	2.71	2	Y	Above Screening Value
VANADIUM	5/5	12.7	36.1	28.3	AOC05DP0102	130	0	51.3	0	N	Below Screening Value
ZINC	5/5	47.6	83.5	61.3	AOC05DP0102	200	0	113	0	N	Below Screening Value

NA - Not Applicable
ND - Not Detected
NV - No Value Established
1 References for screening levels are presented on Table 2-19

TABLE 10-21

SUMMARY OF TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENTS - AOC 5
CONSERVATIVE AND AVERAGE INPUTS
PHASE I AND II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER, INDIANAPOLIS
MARION COUNTY, INDIANA

	Conservative Inputs				Average Inputs			
	Meadow Vole		American Robin		Vole		Robin	
COPCs	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Volatile Organic								
TETRACHLOROETHENE	7.89E-04	1.56E-04	--	--	6.13E-05	1.21E-05	--	--
TRICHLOROETHENE	3.16E-03	3.16E-04	--	--	3.10E-04	3.10E-05	--	--
Inorganics								
ANTIMONY	[illegible]	9.72E-01	--	--	[illegible]	2.93E-01	--	--
CADMIUM	[illegible]	4.54E-01	[illegible]	[illegible]	4.18E-01	4.18E-02	[illegible]	6.63E-01
THALLIUM	[illegible]	[illegible]	--	--	[illegible]	[illegible]	--	--

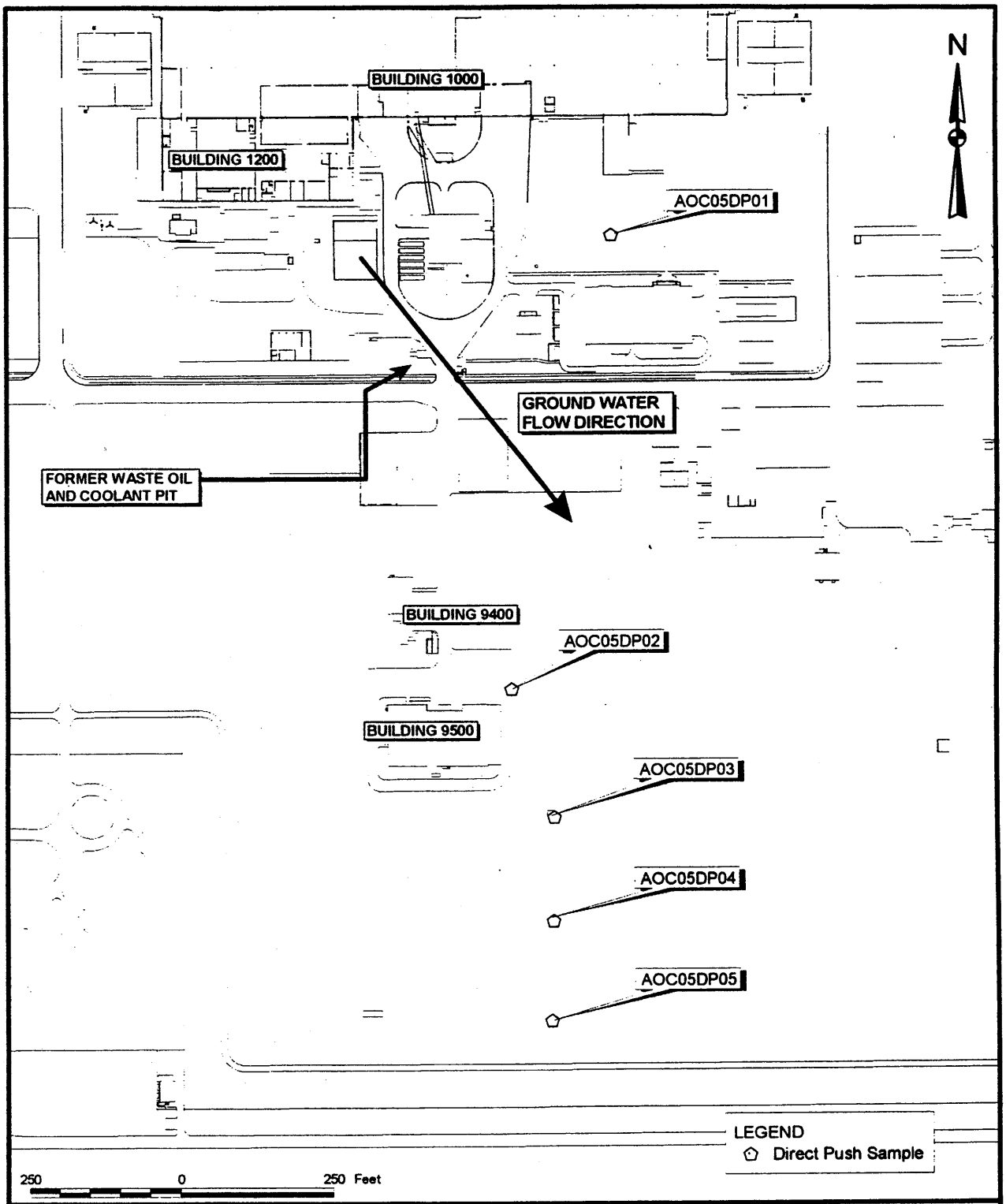
-- No toxicity data was available for this contaminant so an HQ could not be calculated
Shaded cells are contaminants with HQs greater than 1
HQn - Hazard Quotient for the NOAEL
HQl - Hazard Quotient for the LOAEL

TABLE 10-23

TERRESTRIAL FLORA AND INVERTEBRATE FAUNA HAZARD QUOTIENTS - AOC 5
PHASE I AND II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER, INDIANAPOLIS
MARION COUNTY, INDIANA

COPC	Average Result	Maximum Detection	Screening Level (1)	Average Hazard Quotient	Maximum Hazard Quotient
Inorganics (mg/kg)					
THALLIUM	1.8	3.3	1		

1 - References for screening levels are presented on Table 2-19



DRAWN BY: CHAD P GLICK	DATE: 25-June-99	AOC 5 RI SAMPLING LOCATIONS NORTH-SOUTH SANITARY SEWER AOC 5 DECISION DOCUMENT NAVAL AIR WARFARE CENTER INDIANAPOLIS MARION COUNTY, INDIANA	CONTRACT NUMBER: 12
CHECKED BY:	DATE:		APPROVED BY: K. HENN — DATE: 6/25/99
COST/SCHEDULE-AREA:			APPROVED BY: — DATE: 7/14/99
SCALE: AS NOTED			DRAWING NO: FIGURE A-1 — REV: 1

P:\GIS\7173\7173_PROPOSED_PLAN APR 6/25/99 CPG AOC 5 LOCATION LAYOUT

AOC 5

APPENDIX B

INSTITUTIONAL CONTROL PLAN

AREA OF CONCERN (AOC) 5 IC PLAN

A. DESCRIPTION OF THE SITE:

AOC 5 consists of the Transferable Portion of the North – South Sanitary Sewer centrally located within the NAWC Indianapolis facility. The NAWC is located in Marion County, east of downtown Indianapolis and is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south and Windsor Branch, a surface water tributary to the east.

B. IDENTIFICATION OF RESIDUAL RISK(S) PRESENTED:

Thallium was the only chemical in soil at AOC 5 with concentrations exceeding federal and state risk-based screening criteria. Residential criteria for the protection of groundwater as a drinking water source for thallium was the only criteria exceeded. No groundwater samples were collected at AOC 5, consequently, it is not known if thallium has migrated from soil to groundwater. Thallium was not detected in groundwater samples taken downgradient of the site at concentrations exceeding applicable criteria. Based upon the data collected at this site, the residual risk presented is from the potential for thallium to migrate from soil to groundwater and potentially impact the quality of the groundwater.

C. TYPES OF ICS IMPOSED:

The Navy intends on utilizing deed provisions to impose upon future transferees, their successors, assigns, lessees or licensees of the real property and facilities which encompass AOC 5, those restrictions necessary to ensure continued protection of human health and the environment. Those restrictions may be summarized as follows:

1. A prohibition against residential or residential-like uses of the property without prior authorization from the Navy (the reasonable anticipated future use at this site is industrial);

2. A requirement for annual compliance reporting by the future owner(s) of the NAWC property of the fact that only industrial uses of the property have been allowed.

D. PROPOSED DEED LANGUAGE IMPLEMENTING ICS:

The following land and groundwater use restriction provisions or their substantial equivalents will be incorporated into the quitclaim deed which shall effect the transfer of the property and facilities encompassing AOC 5 to any transferee:

1. The Grantee its successors, assigns, lessees, and licensees are prohibited from utilizing any portion of the real property and facilities encompassing AOC 5 as depicted in the attached survey for residential or residential type uses without the prior written authorization from the Navy. Such prohibited uses shall include, but not be limited to, nurseries, child or full time adult day care facilities or any playground area. Any additional site evaluation(s), risk assessment(s) and potential remedial measures as may be necessary if future usage of the property is for other than industrial purposes shall be without costs to the United States.

E. PARTY RESPONSIBLE FOR MONITORING THE INTEGRITY AND EFFECTIVENESS OF IMPOSED CONTROL(S):

The Navy intends on maintaining responsibility for overseeing the integrity and effectiveness of the IC remedy selected for AOC 5. The Navy plans on doing this by requiring annual IC compliance reporting by subsequent transferees of the property and facilities encompassing this site and by conducting all required CERCLA Five-Year Reviews.

F. PROCEDURES FOR REPORTING AND ENFORCING AGAINST IC VIOLATIONS

Should the Navy learn that any subsequent owner, occupant or third party has violated or caused to be violated any IC associated with AOC 5, the Navy shall evaluate at that time whether it would be appropriate to exercise the response authorities granted to it under CERCLA Section 104 (42 USC 9604), the Defense Environmental Restoration Program (DERP) (10 USC 2701 et. seq.) and Executive Order 12580, in order to ensure continued protectiveness of the site remedy implemented. The Navy will also evaluate the appropriateness of pursuing whatever rights it may have contractually or otherwise and/or for cost recovery under CERCLA Section 107 (42 USC 9607) against the violator of that IC(s). The Navy shall also promptly notify by letter the appropriate IDEM and U.S. EPA representatives upon learning of any IC violation(s) so that U.S. EPA can initiate whatever enforcement action U.S. EPA may believe to be appropriate at that time against such violator(s).

To ensure the opportunity for the Navy and U.S. EPA to be able to enforce the ICs associated with AOC 5, the Navy shall insert the following provisions or their substantial equivalent into the quitclaim deed which shall effect the transfer of the property encompassing AOC 5 to any third party:

1. The Navy reserves a right of access to all portions of the property for environmental investigation, remediation or other corrective actions. This reservation includes the right of access to and use of, to the extent permitted by law, available utilities at reasonable cost. These rights shall be exercisable in any case in which a remedial action, response action or corrective action is found

to be necessary by the Navy after the date of conveyance of the property, or in which access is necessary to carry out a remedial action, response action or corrective action on adjoining property. Pursuant to this reservation, the Navy, the U.S. EPA and the State of Indiana, and their officers, agents, employees, contractors and subcontractors shall have the right (upon reasonable notice to the Grantee or the then owner and any authorized occupant of the property) to enter upon the Property and conduct investigations and surveys, to include drillings, test-pitting, borings, data and record compilation, and other activities related to environmental investigation and to carry out remedial or removal actions as required or necessary under applicable authorities, including but not limited to monitoring wells, pumping wells, and treatment. Any such entry, including such activities, responses or remedial actions, shall be coordinated with the Grantee or its successors assigns, and tenants and shall be performed in a manner which minimizes interruption with Grantee's activities on the property.

2. The Grantee, its successors, assigns, lessees and licensees are prohibited from unreasonably interfering with any environmental investigation or remedial activities to be undertaken by the Navy on the property encompassing AOC 5 or surrounding NAWC property.

G. ASSURANCES REGARDING COMPLETION OF THE CERCLA FIVE-YEAR REVIEW PROCESS:

It is the Navy's intent to fully comply with the requirements of CERCLA as they may continue to apply to AOC 5 and to continue in part to oversee the long term effectiveness of the selected remedy through the timely undertaking and completion of CERCLA Five-Year Reviews.

H. IC RECORDATION / NOTICE REQUIREMENTS:

Those specific ICs reflected in this ICP and in the Proposed Plan (PP) and Decision Document (DD) for AOC 5 will be reflected in the quitclaim deed which shall be used to effect the transfer of the property encompassing AOC 5 and such deed will be recorded in the appropriate local property records office for the property by the transferee(s) of the real property upon which the site is situated. The transferee will be provided advance notice of those ICs and all pertinent site conditions by first being provided with a copy of this plan, the Environmental Baseline Survey (EBS) and requisite Finding of Suitability to Transfer (FOST) prepared by the Navy in connection with such transfer.

I. COMMITMENT TO PRE-TRANSFER MEETING:

To the extent appropriated funds may be available for such purposes, the Navy commits to meet at least five days before transfer with any and all prospective transferees of the real property and facilities encompassing AOC 5 in order to ensure that such transferee(s) fully understands the provisions of this plan.